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Technology Challenges and Solutions for People with Disabilities: The National Security Agency (NSA) Experience

Rehabilitation and Assistive Technology Society of North America
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Technology Challenges and Solutions for People with Disabilities:
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Presentation Outline

- Introductions and Overview of NSA
- The Office of Disability Affairs at NSA
- Presentation of Current Cases and Solutions
- Work in Progress – Unresolved Challenges
- Discussion Period



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NSA Vision and Mission

- Information Superiority for America and Its Allies
- To Provide and Protect Vital Information for the Nation



The Problem

At the beginning of the 1990's there was a strong desire to create a Disability Technology Center to serve employees with disabilities in the National Security Agency.



Environmental Factors

The Setting

- Passage of the Americans with Disabilities Act of 1990
- A rapidly increasing pace of available computer and technological assistive devices
- Failure to meet Federal Affirmative Action goals for employees with disabilities
- A growing number of cases referred by employees and supervisors wanting to keep employees who develop disabilities AND maintain their level of pre-disability productivity



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Just Do It

The Ingredients

- No corporate commitment
- No sponsorship
- No leader
- No space
- No people
- No money
- Business case presented to Director, NSA
- Director, EEO
- Director, CCAT
- Took what was available
- Start small (2-3 people)
- Start small (\$60k-\$100k)
 - Maximize use of Department of Defense Computer/Electronics Accommodation Program



Ensuring Survival Bureaucratizing the Solution

- Every new Director, EEOD affirms support as a top priority (inclusion in Strategic Plan for EEOD operations) and obtains support from the Director, NSA
- The current Chief, Office of Disability Affairs has been in place for 15 years
- Moved from available space to permanent, optimal space through planning
- Right skill mix – Government/Contractor mix. Corporate commitment to staff
- A formal funded program, with a program manager was created and incorporated into NSA's 5 year budget cycle: a steady \$500K+ annual budget plus manpower



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The Result

The National Security Agency has over 18 years experience behind its state-of-the-art Office of Disability Affairs Technology Center for employees with disabilities, which has a very promising future for continued service to NSA's most important national security asset – our people.



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The Office of Disability Affairs

Ms. Pattie Dahlen
Chief



Office Overview

- Chief
- Deputy Chief
- ADA Facility Project Manager
- Ergonomic Specialist/ RA Case Worker
- RA Case Worker
- 4 Sign Language Interpreters
- Deaf/Hard-of-Hearing Engineer
- 2 System Engineers
- Retired Annuitant – Sign Language Interpreter



Responsibilities

- Facilitate the reasonable accommodation process
 - Conduct needs assessments and provide solutions
 - Ensure Facility Accessibility
- Education of the Work Force
 - Sign Language Classes
 - Gaining Offices
 - Leadership
 - Section 508 (to include web and software development)



Responsibilities (con't)

- Disability-Related Policy
- Consultation with Agency partners
- Counseling employees/supervisors on difficult or sensitive issues
- Research, test and evaluate new Assistive Technologies



Responsibilities (con't)

- Evaluate websites and on-line courses for accessibility/usability
- Assist the Office of Recruitment at various colleges, disability career fairs and hiring events
- Participate in Operation War Fighter
- Conduct Tours/Demonstrations



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Office of Disability Affairs LAB

- Provides:

- Opportunity for employees to see a variety of equipment that satisfies agency requirements and are “options” for accommodations
- Testing, research and development to integrate new/updated technology into the agency
- Workforce re-entry for employees after long-term absence
- Hands-on demonstrations to managers, supervisors, offices, and VIP's
- Ergonomic Assessments and Assistive Technology for Workstation Considerations
- Centralized communications center for overflow events (video streams into classes, meetings, etc.)



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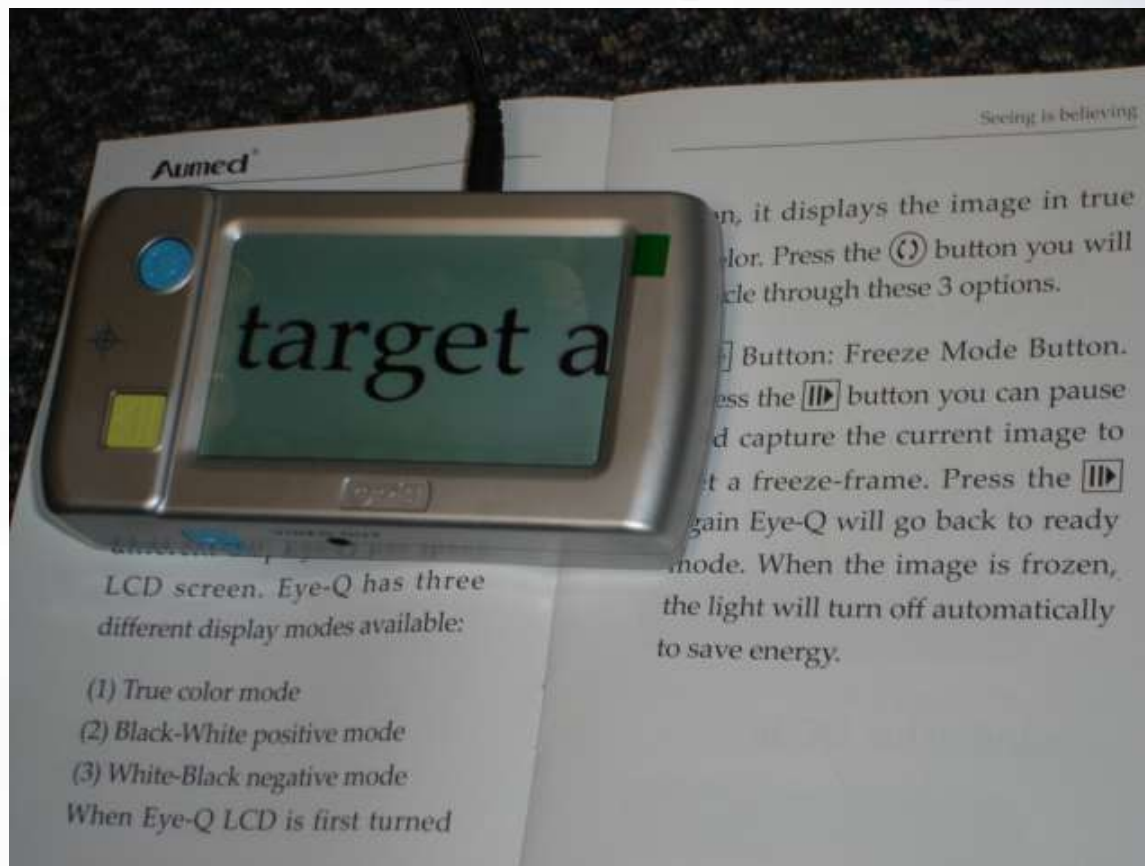
Provides:

- Resource information on community, state, national resource information
- Contacts within the DoD, IC and overall federal government
- Recruitment guidance on how to interact with individuals with variety of disabilities seeking employment
- Knowledge, skills and expertise in creating Agency accepted policies, procedures and practices for Agency compliance as it increases the number of individuals with disabilities in the workplace
- Counseling to employees, managers, supervisors, co-workers, trainers, etc.
- Consultation to external requests as the Model for the Federal Government



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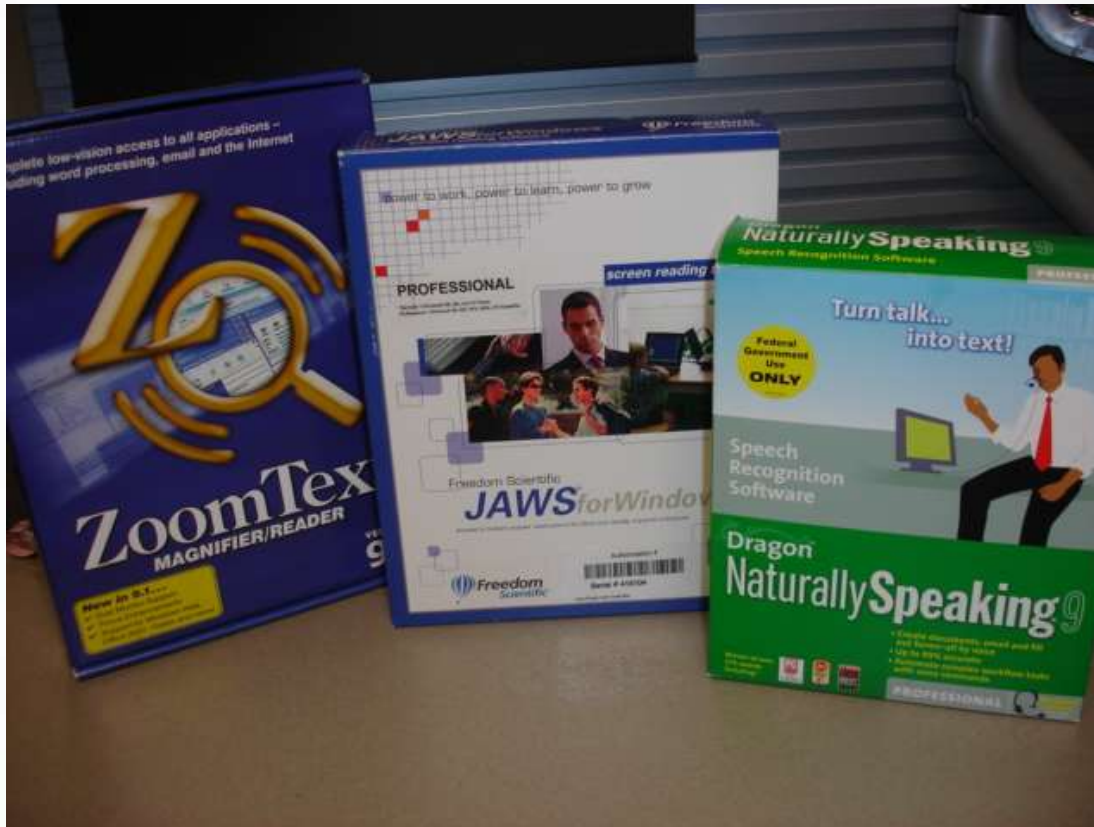
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The National Security Agency (NSA) Experience

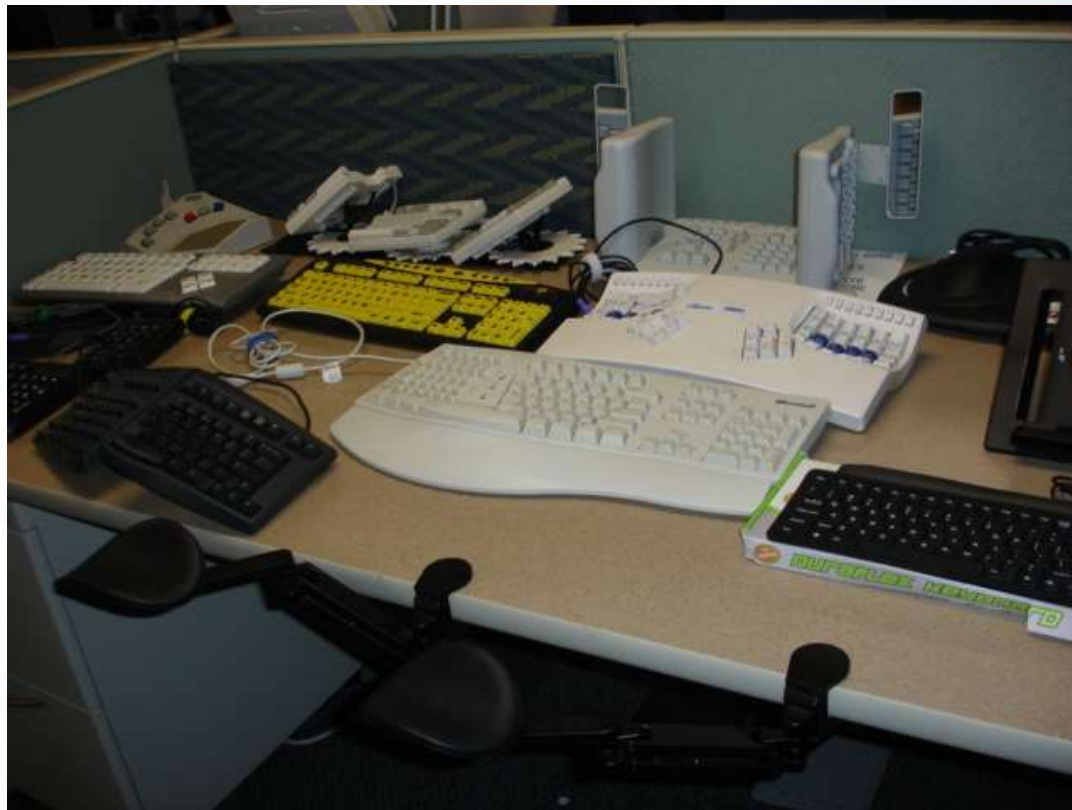
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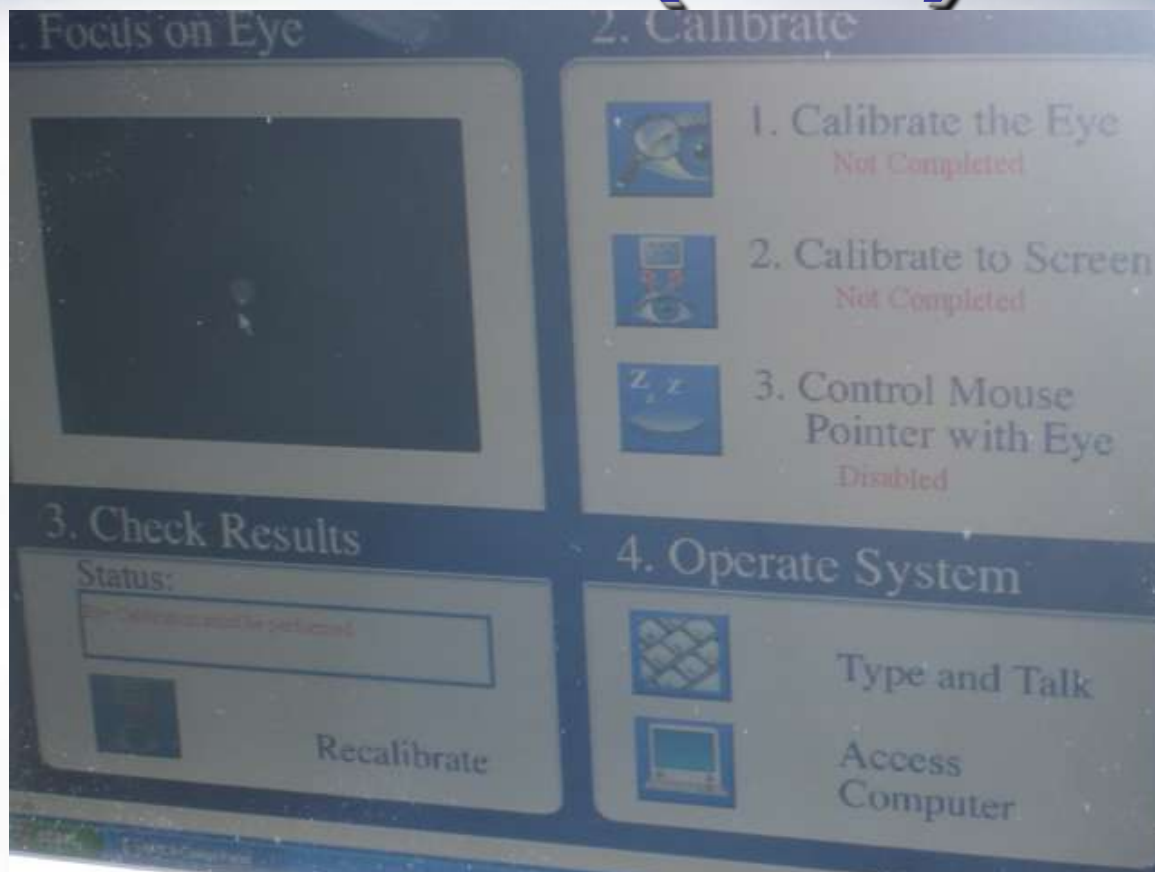
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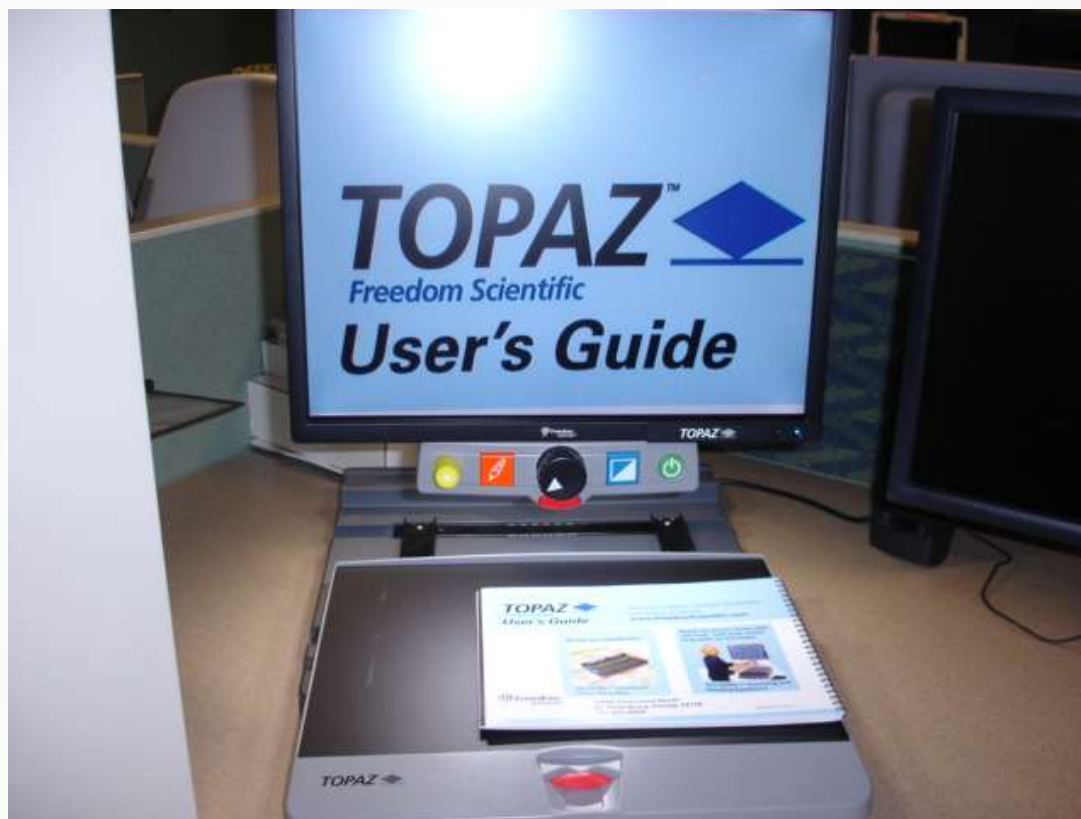
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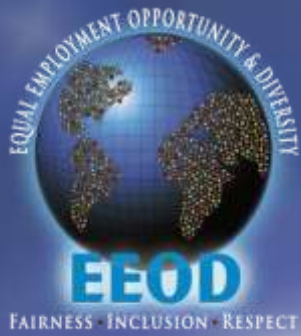




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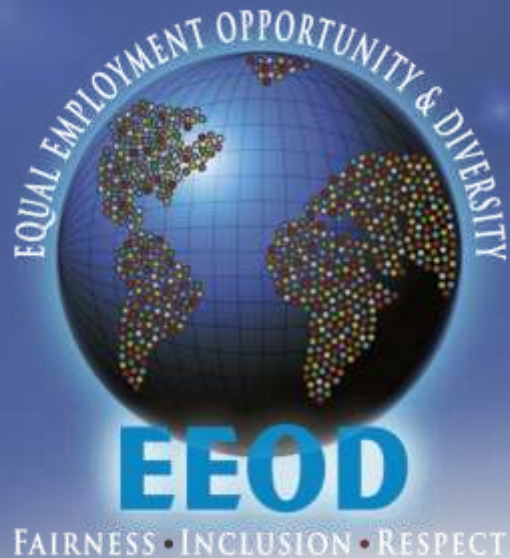
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Limitations

- Security
- Wireless
- Compatibility with current Agency infrastructure
- Timeliness (request to expectation of receipt)
- Agency Process Practices that we must follow



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Unique Solutions



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Evolving Solutions to Blind User Accessibility of Corporate Business Applications

**Mr. Joe Cummings
Systems Engineer**



Overview - Evolving Solutions

- Accessibility in the evolution/migration of Analyst Applications: from unix to windows, to web, X11/Motif, java/swing to SWT (Standard Widget Toolkit)/Jface to "Web 2.0"

Three main issues to accessibility

- **Access to Client Workstation (screen reader)**
- **Application compatible with screen reader**
- **Accessible Content Type (i.e. pdf, text/html)**

Note: Audience assumed to have some familiarity with software development terms



PAST 80's-90s

- Unix desktops with X11/Motif application environment
- ***Problem:*** no screen reader for application environment, inaccessible widgets
- ***Solution:*** command line interface and emacs with emacspk
- ***Limitation(s):*** no universal design & limited to textual representation



PRESENT 90s-2000s

- Mix of unix & windows desktops using java/swing for analyst applications
- **Problem:** java/swing widgets not initially supported on windows desktop nor did screen readers support java/swing
- **Solution:** Access Bridge + Accessibility API + partnership with screen reader vendor to support java/swing
- **Limitation(s):** Three legged stool approach
- **demo**






Java/Swing Demo

Swing Demo - Version 6.1

File Edit Format

TextArea Two Text Fields Toggles Toolbar Tree
 More Labels Password Sliders **Table** TextArea One
 Bordered Panels Buttons Combo Boxes Label List

First	Middle	Last
John	Joe	Doe
Sue	Ann	Smith
Jenny	M	Carson
Jason	Ken	Baker

First Name	Last Name	Sport	Status	# of Yea...	Vegetarian
Mary	Campione	Snowboarding		5	<input type="checkbox"/>
Alison	Huml	Rowing		3	<input checked="" type="checkbox"/>
Kathy	Walrath	Chasing toddlers		2	<input type="checkbox"/>
Mark	Andrews	Speed reading		20	<input checked="" type="checkbox"/>
Angela	Lih	Teaching high school		4	<input type="checkbox"/>

This example shows the use of a JTable. The accessible names for the tables were set manually using the `setAccessibleName()` method. The first table is a simple JTable. The second table is more complicated - other Java components (other than just plain text) are contained within the table cells.



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PRESENT 2000s-2010s

- Largely Windows desktop moving to Eclipse based, SWT, Jface apps
- ***Problem:*** Not all SWT/Jface component mappings to native widgets were accessible
- ***Solution:*** Select widgets carefully , work with sources to improve accessibility (in-progress)
- ***Limitations:*** No “three legged stool,” but technology still has some “bugs” or architectural issues
- **demo**



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FUTURE late 2010 – Beyond...

- “Web 2.0,” extjs, etc.
- **Problem:** New “Web 2.0” technologies don’t always implement WAI-ARIA or proper accessibility support
- **Solution:** Work w/technology providers to implement WAI-ARIA support (in-progress)
- **Limitations:** Small business, limited resources
- **demo**



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OWF/extjs Demo



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Future Dilemmas

- Thin clients
- New desktop widgets
- New “Web N” widgets
- New devices, i.e. readers



Resources

- Java/Swing - <http://java.sun.com/javase/>
- Java Accessibility API & Access Bridge-
<http://java.sun.com/javase/technologies/accessibility/index.jsp>
- Eclipse - <http://eclipse.org/>
- SWT/JFace - <http://www.eclipse.org/swt/>,
<http://wiki.eclipse.org/index.php/JFace>



Resources (con't.)

- Swing Demo - <http://securetechnologies.com/CCAT/SwingDemo/>
- TreeViewer problem - Eclipse Bug # 73485 - <http://www.eclipse.org/newsportal/article.php?id=44261&group=eclipse.platform.swt#44261>
- WAI-ARIA: <http://www.w3.org/WAI/intro/aria>



Definitions

- X11: a computer software system and network protocol that provides a graphical user interface (GUI) for networked computers
- Motif (widget toolkit): A graphical user interface toolkit used in software development
- Java Swing: A widget toolkit for java
- SWT: a graphical widget toolkit for use with the Java platform



Definitions (con't.)

- Jface: A UI toolkit that provides helper classes for developing UI features that can be tedious to implement.
- WAI-ARIA: WAI-ARIA, the Accessible Rich Internet Applications Suite, defines a way to make Web content and Web applications more accessible to people with disabilities.
- Emacs – A feature-rich, extensible text editor.
- Emacspeak – A free screen reader for emacs



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Case Study Situations



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Questions?



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Thank you

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